PRACTICE PROBLEMS

1 If the price elasticity coefficient of the demand curve for paper clips is equal to −1, demand is:

A elastic.

B inelastic.

C unit elastic.

2 The demand for membership at a local health club is determined by the following equation:

$$Q_{hm}^{d} = 400 - 5P_{hm}$$

where Q_{hm}^{d} is the number of health club members and P_{hm} is the price of membership. If the price of health club membership is \$35, the price elasticity of demand is *closest* to:

A –0.778.

B –0.500.

C –0.438.

3 Price elasticity of demand for a good will *most likely* be greater if:

A there are no substitutes for the good.

B consumers consider the good as discretionary.

C consumers spend a small portion of their budget on the good.

4 If the income elasticity of demand for a product is –0.6, a:

A 1% increase in income will result in a 0.6% increase in demand.

B 1% increase in income will result in a 0.6% decrease in demand.

C 0.6% increase in income will result in a 1% decrease in demand.

5 An individual's demand for onions is given by the following equation:

$$Q_{o}^{d} = 3 - 0.05P_{o} + 0.009I - 0.16P_{t}$$

where Q_{o}^{d} is the number of onions demanded, P_o is the price per pound of onions, I is the household income, and P_t is the price per pound of tomatoes.

If the price of onions is \$1.25, household income is \$2,500, and the price of tomatoes is \$3.75, the cross-price elasticity of demand for onions with respect to the price of tomatoes is *closest* to:

A –1.0597.

B –0.0242.

C –0.0081.

6 Movement along the demand curve for good X occurs due to a change in:

A income.

B the price of good X.

C the price of a substitute for good X.

7 A wireless phone manufacturer introduced a next-generation phone that received a high level of positive publicity. Despite running several high-speed production assembly lines, the manufacturer is still falling short in meeting demand for the phone nine months after introduction. Which of the following statements is the *most* plausible explanation for the demand/supply imbalance?

A The phone price is low relative to the equilibrium price.

B Competitors introduced next-generation phones at a similar price.

C Consumer incomes grew faster than the manufacturer anticipated.

The following information relates to Questions 8–11

The market demand function for four-year private universities is given by the equation

$$Q_{pr}^{d} = 84 - 3.1P_{pr} + 0.8I + 0.9P_{pu}$$

where Q_{pr}^{d} is the number of applicants to private universities per year in thousands, P_{pr} is the average price of private universities (in thousands of USD), I is the household monthly income (in thousands of USD), and P_{pu} is the average price of public (government-supported) universities (in thousands of USD). Assume that P_{pr} is equal to 38, I is equal to 100, and P_{pu} is equal to 18.

8 The price elasticity of demand for private universities is *closest* to:

A –3.1.

B –1.9.

C 0.6.

9 The income elasticity of demand for private universities is *closest* to:

A 0.5.

B 0.8.

C 1.3.

10 The cross-price elasticity of demand for private universities with respect to the price of public universities is *closest* to:

A 0.3.

B 3.1.

C 3.9.

11 If the cross-price elasticity between two goods is negative, the two goods are classified as:

A normal.

B substitutes.

C complements.

---

12 In the case of a normal good with a decrease in own price, which of the following statements is *most likely* true?

A Both the substitution and income effects lead to an increase in the quantity purchased.

B The substitution effect leads to an increase in the quantity purchased, while the income effect has no impact.

C The substitution effect leads to an increase in the quantity purchased, while the income effect leads to a decrease.

13 For a Giffen good, the:

A demand curve is positively sloped.

B substitution effect overwhelms the income effect.

C income and substitution effects are in the same direction.

14 Normal profit is best described as:

A zero economic profit.

B total revenue minus all explicit costs.

C the sum of accounting profit plus economic profit.

15 A company plans to hire additional factory employees. In the short run, marginal returns are most likely to decrease if:

A the factory is operating at full capacity.

B the factory is experiencing a labor shortage.

C workers are required to multitask and share duties.

16 The production relationship between the number of machine hours and total product for a company is presented below.

Machine Hours	Total Product	Average Product
1	3	3.00
2	8	4.00
3	14	4.67
4	19	4.75
5	21	4.20

Diminishing marginal returns first occur beyond machine hour:

A 3.

B 4.

C 5.

17 The marketing director for a Swiss specialty equipment manufacturer estimates the firm can sell 200 units and earn total revenue of CHF500,000. However, if 250 units are sold, revenue will total CHF600,000. The marginal revenue per unit associated with marketing 250 units instead of 200 units is *closest* to:

A CHF 2,000.

B CHF 2,400.

C CHF 2,500.

18 An agricultural firm operating in a perfectly competitive market supplies wheat to manufacturers of consumer food products and animal feeds. If the firm were able to expand its production and unit sales by 10% the *most likely* result would be:

A a 10% increase in total revenue.

B a 10% increase in average revenue.

C an increase in total revenue of less than 10%.

19 An operator of a ski resort is considering offering price reductions on weekday ski passes. At the normal price of €50 per day, 300 customers are expected to buy passes each weekday. At a discounted price of €40 per day 450 customers are expected to buy passes each weekday. The marginal revenue per customer earned from offering the discounted price is *closest* to:

A €20.

B €40.

C €50.

20 The marginal revenue per unit sold for a firm doing business under conditions of perfect competition will *most likely* be:

A equal to average revenue.

B less than average revenue.

C greater than average revenue.

The following information relates to Questions 21–23

A firm's director of operations gathers the following information about the firm's cost structure at different levels of output:

Exhibit 1

Quantity (Q)	Total Fixed Cost (TFC)	Total Variable Cost (TVC)
0	200	0
1	200	100
2	200	150
3	200	200
4	200	240
5	200	320

21 Refer to the data in Exhibit 1. When quantity produced is equal to 4 units, the average fixed cost (*AFC*) is *closest* to:

A 50.

B 60.

C 110.

22 Refer to the data in Exhibit 1. When the firm increases production from 4 to 5 units, the marginal cost (*MC*) is *closest* to:

A 40.

B 64.

C 80.

23 Refer to the data in Exhibit 1. The level of unit production resulting in the lowest average total cost (*ATC*) is *closest* to:

A 3.

B 4.

C 5.

---

24 The short-term breakeven point of production for a firm operating under perfect competition will *most likely* occur when:

A price is equal to average total cost.

B marginal revenue is equal to marginal cost.

C marginal revenue is equal to average variable costs.

25 The short-term shutdown point of production for a firm operating under perfect competition will *most likely* occur when:

A price is equal to average total cost.

B marginal revenue is equal to marginal cost.

C marginal revenue is equal to average variable costs.

26 Under conditions of perfect competition, a company will break even when market price is equal to the minimum point of the:

A average total cost curve.

B average variable cost curve.

C short-run marginal cost curve.

27 A company will shut down production in the short run if total revenue is less than total:

A fixed costs.

B variable costs.

C opportunity costs.

28 A company has total variable costs of $4 million and fixed costs of $3 million. Based on this information, the company will stay in the market in the long term if total revenue is at least:

A $3.0 million.

B $4.5 million.

C $7.0 million.

29 When total revenue is greater than total variable costs but less than total costs, in the short term a firm will *most likely*:

A exit the market.

B stay in the market.

C shut down production.

30 A profit maximum is *least likely* to occur when:

A average total cost is minimized.

B marginal revenue equals marginal cost.

C the difference between total revenue and total cost is maximized.

31 A firm that increases its quantity produced without any change in per-unit cost is experiencing:

A economies of scale.

B diseconomies of scale.

C constant returns to scale.

32 A company is experiencing economies of scale when:

A cost per unit increases as output increases.

B it is operating at a point on the LRAC curve where the slope is negative.

C It is operating beyond the minimum point on the long-run average total cost curve.

33 Diseconomies of scale *most likely* result from:

A specialization in the labor force.

B overlap of business functions and product lines.

C discounted prices on resources when buying in larger quantities.

34 A firm is operating beyond minimum efficient scale in a perfectly competitive industry. To maintain long-term viability the *most likely* course of action for the firm is to:

A operate at the current level of production.

B increase its level of production to gain economies of scale.

C decrease its level of production to the minimum point on the long-run average total cost curve.

35 Under conditions of perfect competition, in the long run firms will *most likely* earn:

A normal profits.

B positive economic profits.

C negative economic profits.

The following information relates to Questions 36 and 37

The manager of a small manufacturing firm gathers the following information about the firm's labor utilization and production:

Exhibit 2

Labor (*L*)	Total Product (*TP*)
0	0
1	150
2	320
3	510
4	660
5	800

36 Refer to the data in Exhibit 2. The number of workers resulting in the highest level of average product of labor is *closest* to:

A 3.

B 4.

C 5.

37 Refer to the data in Exhibit 2. The marginal product of labor demonstrates increasing returns for the firm if the number of workers is *closest* to but not more than:

A 2.

B 3.

C 4.

SOLUTIONS

1 C is correct. When the price elasticity of demand coefficient is –1, demand is said to be unit elastic, or unitary elastic.

2 A is correct. Inserting the price of $35 into the demand function, quantity demanded is calculated as

$$Q_{hm}^{d} = 400 - 5(35) = 225$$

At a price of $35 per health club membership, the elasticity of demand is

$$\text{Price elasticity of demand} = \left(\Delta Q_{hm}^{d} / \Delta P_{hm}\right) \times \left(P_{hm} / Q_{hm}^{d}\right)$$

$$\text{Price elasticity of demand} = -5 \times (35/225) = -0.778$$

3 B is correct. Price elasticity of demand is likely to be greater for items that are seen as optional or discretionary.

4 B is correct. Income elasticity is a measure of how sensitive quantity demanded is to a change in income. If the income elasticity of demand for the product is –0.6, whenever income increases by 1%, the quantity demanded of the product at each price decreases by 0.6%. Consequently, as income rises, consumers will purchase less of the product.

5 B is correct. The cross-price elasticity of demand measures the responsiveness of the demand for onions in response to a change in the price of tomatoes. From the demand function equation:

$$Q_{o}^{d} = 3 - 0.05P_{o} + 0.009I - 0.16P_{t}$$

$$Q_{o}^{d} = 3 - 0.05(1.25) + 0.009(2{,}500) - 0.16(3.75) = 24.8375$$

At a price of onions of $1.25 and a price of tomatoes of $3.75, the cross-price elasticity of demand is calculated as follows:

$$\text{Cross-price elasticity of demand} = \left(\Delta Q_{o}^{d} / \Delta P_{t}\right) \times \left(P_{t} / Q_{o}^{d}\right)$$

$$\text{Cross-price elasticity of demand} = -0.16 \times (3.75/24.8375) = -0.0242$$

6 B is correct. The demand curve shows quantity demanded as a function of own price only.

7 A is correct. The situation described is one of excess demand because, in order for markets to clear at the given level of quantity supplied, the company would need to raise prices.

8 B is correct. From the demand function:

Solve for Q_{pr}^{d}:

$$\Delta Q_{pr}^{d} / \Delta P_{pr} = -3.1 \text{ (the coefficient in front of own price)}$$

$$\begin{aligned} Q_{pr}^{d} &= 84 - 3.1P_{pr} + 0.8I + 0.9P_{pu} \\ &= 84 - 3.1(38) + 0.8(100) + 0.9(18) \\ &= 62.4 \end{aligned}$$

At P_{pr} = 38,

$$\text{price elasticity of demand} = \left(\Delta Q^d_{pr} / \Delta P_{pr}\right)\left(P_{pr} / Q^d_{pr}\right)$$
$$= (-3.1)(38/62.4)$$
$$= -1.9$$

9 C is correct. From the demand function:

Solve for Q^d_{pr}:

$$\Delta Q^d_{pr} / \Delta I = 0.8 \text{ (coefficient in front of the income variable)}$$

$$Q^d_{pr} = 84 - 3.1P_{pr} + 0.8I + 0.9P_{pu}$$
$$= 84 - 3.1(38) + 0.8(100) + 0.9(18)$$
$$= 62.4$$

At I = 100,

$$\text{the income elasticity of demand} = \left(\Delta Q^d_{pr} / \Delta I\right)\left(I / Q^d_{pr}\right)$$
$$= (0.8)(100/62.4)$$
$$= 1.3$$

10 A is correct. From the demand function:

Solve for Q^d_{pr}:

$$\Delta Q^d_{pr} / \Delta P_{pu} = 0.9 \text{ (the coefficient in front of } P_{pu}\text{)}$$

$$Q^d_{pr} = 84 - 3.1P_{pr} + 0.8I + 0.9P_{pu}$$
$$= 84 - 3.1(38) + 0.8(100) + 0.9(18)$$
$$= 62.4$$

At P = 38, and P_{pu} = 18,

$$\text{the cross-price elasticity of demand} = \left(\Delta Q^d_{pr} / \Delta P_{pu}\right)\left(P_{pu} / Q^d_{pr}\right)$$
$$= (0.9)(18/62.4)$$
$$= 0.3$$

11 C is correct. With complements, consumption goes up or down together. With a negative cross-price elasticity, as the price of one good goes up, the demand for both falls.

12 A is correct. In the case of normal goods, the income and substitution effects are reinforcing, leading to an increase in the amount purchased after a drop in price.

13 A is correct. The income effect overwhelms the substitution effect such that an increase in the price of the good results in greater demand for the good, resulting in a positively sloped demand curve.

14 A is correct. Normal profit is the level of accounting profit such that implicit opportunity costs are just covered; thus, it is equal to a level of accounting profit such that economic profit is zero.

15 A is correct. The law of diminishing returns occurs in the short run when additional output falls as more and more labor is added to a fixed amount of capital. When a factory is operating at full capacity, adding additional employees will

not increase production because the physical plant is already 100% employed. More labor hours will add to costs without adding to output, thus resulting in diminishing marginal returns.

16 A is correct. Diminishing marginal returns occur when the marginal product of a resource decreases as additional units of that input are employed. Marginal product, which is the additional output resulting from using one more unit of input, is presented below.

Machine Hours	Total Product	Average Product	Marginal Product
1	3	3.00	3
2	8	4.00	5
3	14	4.67	6
4	19	4.75	5
5	21	4.20	2

The marginal product of the third machine hour is 6 and declines thereafter. Consequently, diminishing marginal returns are first evident beyond three machine hours.

17 A is correct. Marginal revenue per unit is defined as the change in total revenue divided by the change in quantity sold. MR = ΔTR ÷ ΔQ. In this case, change in total revenue equals CHF100,000, and change in total units sold equals 50. CHF100,000 ÷ 50 = CHF2,000.

18 A is correct. In a perfectly competitive market, an increase in supply by a single firm will not affect price. Therefore, an increase in units sold by the firm will be matched proportionately by an increase in revenue.

19 A is correct. Marginal revenue per unit is defined as the change in total revenues divided by the change in quantity sold. MR = ΔTR ÷ ΔQ. In this case, change in total revenue per day equals €3,000 [(450 × €40) – (300 × €50)], and change in units sold equals 150 (450 – 300). €3,000 ÷ 150 = €20.

20 A is correct. Under perfect competition, a firm is a price taker at any quantity supplied to the market, and AR = MR = Price.

21 A is correct. Average fixed cost is equal to total fixed cost divided by quantity produced: AFC = TFC/Q = 200/4 = 50.

22 C is correct. Marginal cost is equal to the change in total cost divided by the change in quantity produced. MC = ΔTC/ΔQ = 80/1 = 80.

23 C is correct. Average total cost is equal to total cost divided by quantity produced. At 5 units produced the average total cost is 104. ATC = TC/Q = 520/5 = 104.

24 A is correct. Under perfect competition, price equals marginal revenue. A firm breaks even when marginal revenue equals average total cost.

25 C is correct. The firm should shut down production when marginal revenue is less than average variable cost.

26 A is correct. A company is said to break even if its total revenue is equal to its total cost. Under conditions of perfect competition, a company will break even when market price is equal to the minimum point of the average total cost curve.

27 B is correct. A company will shut down production in the short run when total revenue is below total variable costs.

28 C is correct. A company will stay in the market in the long term if total revenue is equal to or greater than total cost. Because total costs are \$7 million (\$4 million variable costs and \$3 million fixed costs), the company will stay in the market in the long term if total revenue equals at least \$7 million.

29 B is correct. When total revenue is enough to cover variable costs but not total fixed costs in full, the firm can survive in the short run but would be unable to maintain financial solvency in the long run.

30 A is correct. The quantity at which average total cost is minimized does not necessarily correspond to a profit maximum.

31 C is correct. Output increases in the same proportion as input increases occur at constant returns to scale.

32 B is correct. Economies of scale occur if, as the firm increases output, cost per unit of production falls. Graphically, this definition translates into a long-run average cost curve (LRAC) with a negative slope.

33 B is correct. As the firm increases output, diseconomies of scale and higher average total costs can result when there is overlap and duplication of business functions and product lines.

34 C is correct. The firm operating at greater than long-run efficient scale is subject to diseconomies of scale. It should plan to decrease its level of production.

35 A is correct. Competition should drive prices down to long-run marginal cost, resulting in only normal profits being earned.

36 A is correct. Three workers produce the highest average product equal to 170. AP = 510/3 = 170.

37 B is correct. Marginal product is equal to the change in total product divided by the change in labor. The increase in MP from 2 to 3 workers is 190: MP = $\Delta TP/\Delta L = (510 - 320)/(3 - 2) = 190/1 = 190$.

PRACTICE PROBLEMS

1 A market structure characterized by many sellers with each having some pricing power and product differentiation is *best* described as:

A oligopoly.

B perfect competition.

C monopolistic competition.

2 A market structure with relatively few sellers of a homogeneous or standardized product is *best* described as:

A oligopoly.

B monopoly.

C perfect competition.

3 Market competitors are *least likely* to use advertising as a tool of differentiation in an industry structure identified as:

A monopoly.

B perfect competition.

C monopolistic competition.

4 Upsilon Natural Gas, Inc. is a monopoly enjoying very high barriers to entry. Its marginal cost is \$40 and its average cost is \$70. A recent market study has determined the price elasticity of demand is 1.5. The company will *most likely* set its price at:

A \$40.

B \$70.

C \$120.

5 The demand schedule in a perfectly competitive market is given by P = 93 – 1.5Q (for Q ≤ 62) and the long-run cost structure of each company is:

Total cost:	$256 + 2Q + 4Q^2$
Average cost:	$256/Q + 2 + 4Q$
Marginal cost:	$2 + 8Q$

New companies will enter the market at any price greater than:

A 8.

B 66.

C 81.

6 Companies *most likely* have a well-defined supply function when the market structure is:

A oligopoly.

B perfect competition.

C monopolistic competition.

7 Aquarius, Inc. is the dominant company and the price leader in its market. One of the other companies in the market attempts to gain market share by undercutting the price set by Aquarius. The market share of Aquarius will *most likely*:

A increase.

B decrease.

C stay the same.

8 SigmaSoft and ThetaTech are the dominant makers of computer system software. The market has two components: a large mass-market component in which demand is price sensitive, and a smaller performance-oriented component in which demand is much less price sensitive. SigmaSoft's product is considered to be technically superior. Each company can choose one of two strategies:

- *Open architecture (Open):* Mass market focus allowing other software venders to develop products for its platform.
- *Proprietary (Prop):* Allow only its own software applications to run on its platform.

Depending upon the strategy each company selects, their profits would be:

	SigmaSoft – Open	**SigmaSoft – Prop**
ThetaTech – Open	SigmaSoft 400; ThetaTech 600	SigmaSoft 650; ThetaTech 700
ThetaTech – Prop	SigmaSoft 800; ThetaTech 300	SigmaSoft 600; ThetaTech 400

The Nash equilibrium for these companies is:

A proprietary for SigmaSoft and proprietary for ThetaTech.

B open architecture for SigmaSoft and proprietary for ThetaTech.

C proprietary for SigmaSoft and open architecture for ThetaTech.

9 A company doing business in a monopolistically competitive market will *most likely* maximize profits when its output quantity is set such that:

A average cost is minimized.

B marginal revenue equals average cost.

C marginal revenue equals marginal cost.

10 Oligopolistic pricing strategy *most likely* results in a demand curve that is:

A kinked.

B vertical.

C horizontal.

11 Collusion is *less likely* in a market when:

A the product is homogeneous.

B companies have similar market shares.

C the cost structures of companies are similar.

12 If companies earn economic profits in a perfectly competitive market, over the long run the supply curve will *most likely*:

A shift to the left.

B shift to the right.

C remain unchanged.

13 Over time, the market share of the dominant company in an oligopolistic market will *most likely*:

A increase.

B decrease.

C remain the same.

14 A government entity that regulates an authorized monopoly will *most likely* base regulated prices on:

A marginal cost.

B long run average cost.

C first degree price discrimination.

15 An analyst gathers the following market share data for an industry:

Company	Sales (in millions of €)
ABC	300
Brown	250
Coral	200
Delta	150
Erie	100
All others	50

The industry's four-company concentration ratio is *closest* to:

A 71%.

B 86%.

C 95%.

16 An analyst gathered the following market share data for an industry comprised of five companies:

Company	Market Share (%)
Zeta	35
Yusef	25
Xenon	20
Waters	10
Vlastos	10

The industry's three-firm Herfindahl–Hirschmann Index is *closest* to:

A 0.185.

B 0.225.

C 0.235.

17 One disadvantage of the Herfindahl–Hirschmann Index is that the index:

A is difficult to compute.

B fails to reflect low barriers to entry.

C fails to reflect the effect of mergers in the industry.

18 In an industry comprised of three companies, which are small-scale manufacturers of an easily replicable product unprotected by brand recognition or patents, the *most* representative model of company behavior is:

A oligopoly.

B perfect competition.

C monopolistic competition.

19 Deep River Manufacturing is one of many companies in an industry that make a food product. Deep River units are identical up to the point they are labeled. Deep River produces its labeled brand, which sells for $2.20 per unit, and “house brands” for seven different grocery chains which sell for $2.00 per unit. Each grocery chain sells both the Deep River brand and its house brand. The *best* characterization of Deep River’s market is:

A oligopoly.

B perfect competition.

C monopolistic competition.

SOLUTIONS

1 C is correct. Monopolistic competition is characterized by many sellers, differentiated products, and some pricing power.

2 A is correct. Few sellers of a homogeneous or standardized product characterizes an oligopoly.

3 B is correct. The product produced in a perfectly competitive market cannot be differentiated by advertising or any other means.

4 C is correct. Profits are maximized when MR = MC. For a monopoly, MR = $P[1 - 1/E_p]$. Setting this equal to MC and solving for P:

$$\$40 = P[1 - (1/1.5)] = P \times 0.333$$
$$P = \$120$$

5 B is correct. The long-run competitive equilibrium occurs where MC = AC = P for each company. Equating MC and AC implies $2 + 8Q = 256/Q + 2 + 4Q$.

Solving for Q gives $Q = 8$. Equating MC with price gives $P = 2 + 8Q = 66$. Any price above 66 yields an economic profit because P = MC > AC, so new companies will enter the market.

6 B is correct. A company in a perfectly competitive market must accept whatever price the market dictates. The marginal cost schedule of a company in a perfectly competitive market determines its supply function.

7 A is correct. As prices decrease, smaller companies will leave the market rather than sell below cost. The market share of Aquarius, the price leader, will increase.

8 C is correct. In the Nash model, each company considers the other's reaction in selecting its strategy. In equilibrium, neither company has an incentive to change its strategy. ThetaTech is better off with open architecture regardless of what SigmaSoft decides. Given this choice, SigmaSoft is better off with a proprietary platform. Neither company will change its decision unilaterally.

9 C is correct. The profit maximizing choice is the level of output where marginal revenue equals marginal cost.

10 A is correct. The oligopolist faces two different demand structures, one for price increases and another for price decreases. Competitors will lower prices to match a price reduction, but will not match a price increase. The result is a kinked demand curve.

11 B is correct. When companies have similar market shares, competitive forces tend to outweigh the benefits of collusion.

12 B is correct. The economic profit will attract new entrants to the market and encourage existing companies to expand capacity.

13 B is correct. The dominant company's market share tends to decrease as profits attract entry by other companies.

14 B is correct. This allows the investors to receive a normal return for the risk they are taking in the market.

15 B is correct. The top four companies in the industry comprise 86 percent of industry sales: (300 + 250 + 200 + 150)/(300 + 250 + 200 + 150 + 100 + 50) = 900/1050 = 86%.

16 B is correct. The three-firm Herfindahl–Hirschmann Index is $0.35^2 + 0.25^2 + 0.20^2 = 0.225$.

17 B is correct. The Herfindahl–Hirschmann Index does not reflect low barriers to entry that may restrict the market power of companies currently in the market.

18 B is correct. The credible threat of entry holds down prices and multiple incumbents are offering undifferentiated products.

19 C is correct. There are many competitors in the market, but some product differentiation exists, as the price differential between Deep River's brand and the house brands indicates.

PRACTICE PROBLEMS

1 Which of the following statements is the *most* appropriate description of gross domestic product (GDP)?

A The total income earned by all households, firms, and the government whose value can be verified.

B The total amount spent on all final goods and services produced within the economy over a given time period.

C The total market value of resalable and final goods and services produced within the economy over a given time period.

2 The component *least likely* to be included in a measurement of gross domestic product (GDP) is:

A the value of owner occupied rent.

B the annual salary of a local police officer.

C environmental damage caused by production.

3 Which of the following conditions is *least likely* to increase a country's GDP?

A An increase in net exports.

B Increased investment in capital goods.

C Increased government transfer payments.

4 Which of the following would be included in Canadian GDP for a given year? The market value of:

A wine grown in Canada by US citizens.

B electronics made in Japan and sold in Canada.

C movies produced outside Canada by Canadian film makers.

5 Suppose a painting is produced and sold in 2018 for £5,000. The expenses involved in producing the painting amounted to £2,000. According to the sum-of-value-added method of calculating GDP, the value added by the final step of creating the painting was:

A £2,000.

B £3,000.

C £5,000.

6 A GDP deflator less than 1 indicates that an economy has experienced:

A inflation.

B deflation.

C stagflation.

7 The *most* accurate description of nominal GDP is:

A a measure of total expenditures at current prices.

B the value of goods and services at constant prices.

C a measure to compare one nation's economy to another.

8 From the beginning to the ending years of a decade, the annual value of final goods and services for country *X* increased from €100 billion to €300 billion. Over that time period, the GDP deflator increased from 111 to 200. Over the decade, real GDP for country *X* increased by approximately:

A 50%.

B 67%.

C 200%.

9 If the GDP deflator values for year 1 and year 2 were 190 and 212.8, respectively, which of the following *best* describes the annual growth rate of the overall price level?

A 5.8%.

B 6%.

C 12%.

10 The numerator of the GDP price deflator reflects:

A the value of base year output at current prices.

B the value of current year output at current prices.

C the value of current year output at base year prices.

11 Consider the following data for a hypothetical country:

Account name	Amount ($ trillions)
Consumption	15.0
Capital consumption allowance	1.5
Government spending	3.8
Imports	1.7
Gross private domestic investment	4.0
Exports	1.5

Based only on the data given, the gross domestic product and national income are respectively *closest* to:

A 21.1 and 20.6.

B 22.6 and 21.1.

C 22.8 and 20.8.

12 In calculating personal income for a given year, which of the following would *not* be subtracted from national income?

A Indirect business taxes.

B Undistributed corporate profits.

C Unincorporated business net income.

13 Equality between aggregate expenditure and aggregate output implies that the government's fiscal deficit must equal:

A Private saving – Investment – Net exports.

B Private saving – Investment + Net exports.

C Investment – Private saving + Net exports.

14 Because of a sharp decline in real estate values, the household sector has increased the fraction of disposable income that it saves. If output and investment spending remain unchanged, which of the following is *most likely*?

A A decrease in the government deficit.

B A decrease in net exports and increased capital inflow.

C An increase in net exports and increased capital outflow.

15 Which curve represents combinations of income and the real interest rate at which planned expenditure equals income?

A The IS curve.

B The LM curve.

C The aggregate demand curve.

16 An increase in government spending would shift the:

A IS curve and the LM curve.

B IS curve and the aggregate demand curve.

C LM curve and the aggregate demand curve.

17 An increase in the nominal money supply would shift the:

A IS curve and the LM curve.

B IS curve and the aggregate demand curve.

C LM curve and the aggregate demand curve.

18 An increase in the price level would shift the:

A IS curve.

B LM curve.

C aggregate demand curve.

19 As the price level declines along the aggregate demand curve, the interest rate is *most likely* to:

A decline.

B increase.

C remain unchanged.

20 The full employment, or natural, level of output is *best* described as:

A the maximum level obtainable with existing resources.

B the level at which all available workers have jobs consistent with their skills.

C a level with a modest, stable pool of unemployed workers transitioning to new jobs.

21 Which of the following *best* describes the aggregate supply curve in the short-run (e.g., 1 to 2 years)? The short run aggregate supply curve is:

A flat because output is more flexible than prices in the short run.

B vertical because wages and other input prices fully adjust to the price level.

C upward sloping because input prices do not fully adjust to the price level in the short run.

22 If wages were automatically adjusted for changes in the price level, the short-run aggregate supply curve would *most likely* be:

A flatter.

B steeper.

C unchanged.

23 The *least likely* cause of a decrease in aggregate demand is:

A higher taxes.

B a weak domestic currency.

C a fall in capacity utilization.

24 Which of the following is *most likely* to cause the long-run aggregate supply curve to shift to the left?

A Higher nominal wages.

B A decline in productivity.

C An increase in corporate taxes.

25 Increased household wealth will *most likely* cause an increase in:

A household saving.

B investment expenditures.

C consumption expenditures.

26 The *most likely* outcome when both aggregate supply and aggregate demand increase is:

A a rise in inflation.

B higher employment.

C an increase in nominal GDP.

27 Which of the following is *least likely* to be caused by a shift in aggregate demand?

A Stagflation.

B A recessionary gap.

C An inflationary gap.

28 Following a sharp increase in the price of energy, the overall price level is *most likely* to rise in the short run:

A and remain elevated indefinitely unless the central bank tightens.

B but be unchanged in the long run unless the money supply is increased.

C and continue to rise until all prices have increased by the same proportion.

29 Among developed economies, which of the following sources of economic growth is *most likely* to explain superior growth performance?

A Technology.

B Capital stock.

C Labor supply.

30 Which of the following can be measured directly?

A Potential GDP.

B Labor productivity.

C Total factor productivity.

31 The sustainable growth rate is *best* estimated as:

A the weighted average of capital and labor growth rates.

B growth in the labor force plus growth of labor productivity.

C growth in total factor productivity plus growth in the capital-to-labor ratio.

32 In the neoclassical or Solow growth model, an increase in total factor productivity reflects an increase in:

A returns to scale.

B output for given inputs.

C the sustainable growth rate.

The following information relates to Questions 33–34

An economic forecasting firm has estimated the following equation from historical data based on the neoclassical growth model:

Potential output growth = 1.5 + 0.72 × Growth of labor + 0.28 × Growth of capital

33 The intercept (1.5) in this equation is *best* interpreted as:

A the long-run sustainable growth rate.

B the growth rate of total factor productivity.

C above trend historical growth that is unlikely to be sustained.

34 The coefficient on the growth rate of labor (0.72) in this equation is *best* interpreted as:

A the labor force participation rate.

B the marginal productivity of labor.

C the share of income earned by labor.

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35 Convergence of incomes over time between emerging market countries and developed countries is *most likely* due to:

A total factor productivity.

B diminishing marginal productivity of capital.

C the exhaustion of non-renewable resources.

SOLUTIONS

1 B is correct. GDP is the total amount spent on all final goods and services produced within the economy over a specific period of time.

2 C is correct. By-products of production processes that have no explicit market value are not included in GDP.

3 C is correct. Government transfer payments, such as unemployment compensation or welfare benefits, are excluded from GDP.

4 A is correct. Canadian GDP is the total market value of all final goods and services produced in a given time period within Canada. The wine was produced in Canada and counts towards Canadian GDP.

5 B is correct. This is the value added by the artist: £5,000 – £2,000 = £3,000.

6 B is correct. The GDP Deflator = Nominal GDP/Real GDP. To get a ratio less than 1, real GDP exceeds nominal GDP, which indicates that prices have decreased and, accordingly, deflation has occurred.

7 A is correct. Nominal GDP is defined as the value of goods and services measured at current prices. Expenditure is used synonymously with the value of goods and services since aggregate expenditures must equal aggregate output of an economy.

8 B is correct. Real GDP in the first year was €100 billion/1.11 = €90 and in the last year it was €300 billion/2.00 = €150. Thus, (€150 – €90)/€90 = 0.67 or 67%.

9 A is correct: $(212.8/190)^{1/2} - 1 = 0.0583$ or 5.8%.

10 B is correct.

$$\text{GDP deflator} = \frac{\text{Value of current year output at current year prices}}{\text{Value of current year output at base year prices}} \times 100$$

11 B is correct. GDP = Consumption + Gross private domestic investment + Government Spending + Exports – Imports = 15 + 4 + 3.8 + 1.5 – 1.7 = 22.6. National income = GDP – CCA = 22.6 – 1.5 = 21.1

12 C is correct. Unincorporated business net income is also known as proprietor's income and is included in personal income.

13 A is correct. The fundamental relationship among saving, investment, the fiscal balance, and the trade balance is $S = I + (G - T) + (X - M)$. This form of the relationship shows that private saving must fund investment expenditures, the government fiscal balance, and net exports (= net capital outflows). Rearranging gives $G - T = (S - I) - (X - M)$. The government's fiscal deficit $(G - T)$ must be equal to the private sector's saving/investment balance $(S - I)$ minus net exports.

14 C is correct. The fundamental relationship among saving, investment, the fiscal balance, and the trade balance is $S = I + (G - T) + (X - M)$. Given the levels of output and investment spending, an increase in saving (reduction in consumption) must be offset by either an increase in the fiscal deficit or an increase in net exports. Increasing the fiscal deficit is not one of the choices, so an increase in net exports and corresponding increase in net capital outflows (increased lending to foreigners and/or increased purchases of assets from foreigners) is the correct response.

15 A is correct. The IS curve represents combinations of income and the real interest rate at which planned expenditure equals income.

16 B is correct. The IS curve represents combinations of income and the real interest rate at which planned expenditure equals income. Equivalently, it represents combinations such that

$$S(Y) = I(r) + (G - T) + (X - M)$$

where $S(Y)$ indicates that planned saving is a (increasing) function of income and $I(r)$ indicates that planned investment is a (decreasing) function of the real interest rate. To maintain this relationship, an increase in government spending (G) requires an increase in saving at any given level of the interest rate (r). This implies an increase in income (Y) at each interest rate level—a rightward shift of the IS curve. Unless the LM curve is vertical, the IS and LM curves will intersect at a higher level of aggregate expenditure/income. Since the LM curve embodies a constant price level, this implies an increase in aggregate expenditure at each price level—a rightward shift of the Aggregate Demand curve.

17 C is correct. The LM curve represents combinations of income and the interest rate at which the demand for real money balances equals the supply. For a given price level, an increase in the nominal money supply is also an increase in the real money supply. To increase the demand for real money balances, either the interest must decline or income must increase. Therefore, at each level of the interest rate, income (= expenditure) must increase—a rightward shift of the LM curve. Since the IS curve is downward sloping (higher income requires a lower interest rate), a rightward shift in the LM curve means that the IS and LM curves will intersect at a higher level of aggregate expenditure/income. This implies a higher level of aggregate expenditure at each price level—a rightward shift of the Aggregate Demand curve.

18 B is correct. The LM curve represents combinations of income and the interest rate at which the demand for real money balances equals the supply. For a given nominal money supply, an increase in the price level implies a decrease in the real money supply. To decrease the demand for real money balances, either the interest must increase or income must decrease. Therefore, at each level of the interest rate, income (= expenditure) must decrease—a leftward shift of the LM curve.

19 A is correct. A decrease in the price level increases the real money supply and shifts the LM curve to the right. Since the IS curve is downward sloping, the IS and LM curves will intersect at a higher level of income and a lower interest rate.

20 C is correct. At the full employment, or natural, level of output the economy is operating at an efficient and unconstrained level of production. Companies have enough spare capacity to avoid bottlenecks, and there is a modest, stable pool of unemployed workers (job seekers equal job vacancies) looking for and transitioning into new jobs.

21 C is correct. Due to long-term contracts and other rigidities, wages and other input costs do not fully adjust to changes in the price level in the short-run. Given input prices, firms respond to output price changes by expanding or contracting output to maximize profit. Hence, the SRAS is upward sloping.

22 B is correct. The slope of the short-run aggregate supply curve reflects the extent to which wages and other input costs adjust to the overall price level. Automatic adjustment of wages would mitigate the impact of price changes on profitability. Hence, firms would not adjust output as much in response to changing output prices—the SRAS curve would be steeper.

23 B is correct. A weak domestic currency will result in an increase in aggregate demand at each price level—a rightward shift in the AD curve. A weaker currency will cause a country's exports to be cheaper in global markets. Conversely, imports will be more expensive for domestic buyers. Hence, the net exports component of aggregate demand will increase.

24 B is correct. Productivity measures the efficiency of labor and is the amount of output produced by workers in a given period of time. A decline in productivity implies decreased efficiency. A decline in productivity increases labor costs, decreases profitability and results in lower output at each output price level—a leftward shift in both the short-run and long-run aggregate supply curves.

25 C is correct. The wealth effect explains the impact of increases or decreases in household wealth on economic activity. Household wealth includes financial and real assets. As asset values increase, consumers save less and spend more out of current income since they will still be able to meet their wealth accumulation goals. Therefore, an increase in household wealth results in a rightward shift in the aggregate demand curve.

26 B is correct. Higher aggregate demand (AD) and higher aggregate supply (AS) raise real GDP and lower unemployment, meaning employment levels increase.

27 A is correct. Stagflation occurs when output is declining and prices are rising. This is most likely due to a decline in aggregate supply—a leftward shift of the SRAS curve. Depending on the source of the shift, the LRAS may shift too.

28 B is correct. An increase in energy prices will shift the short-run aggregate supply curve (SRAS) to the left, reducing output and increasing prices. If there is no change in the aggregate demand curve, in particular if the central bank does not expand the money supply, slack in the economy will put downward pressure on in input prices, shifting the SRAS back to its original position. In the long run, the price level will be unchanged.

29 A is correct. Technology is the most important factor affecting economic growth for developed countries. Technological advances are very important because they allow an economy to overcome the limits imposed by diminishing marginal returns.

30 B is correct. Labor productivity can be directly measured as output/hour.

31 B is correct. Output growth is equal to the growth rate of the labor force plus the growth rate of labor productivity, i.e. output per worker. Unlike total factor productivity, output per worker is observable, so this is the most practical way to approach estimation of sustainable growth.

32 B is correct. Total factor productivity (TFP) is a scale factor primarily reflecting technology. An increase in TFP means that output increases for any level of factor inputs.

33 B is correct. The estimated equation is the standard Solow growth accounting equation. The intercept is the growth rate of total factor productivity.

34 C is correct. In the standard Solow growth accounting equation, the coefficient on each factor's growth rate is its share of income.

35 B is correct. Diminishing marginal productivity of capital means that as a country accumulates more capital per worker the incremental boost to output declines. Thus, all else the same, economies grow more slowly as they become more capital intensive. Given the relative scarcity and hence high marginal productivity of capital in developing countries, they tend to grow more rapidly than developed countries. This leads to convergence in income levels over time.

PRACTICE PROBLEMS

1 The characteristic business cycle patterns of trough, expansion, peak, and contraction are:
  A periodic.
  B recurrent.
  C of similar duration.

2 During the contraction phase of a business cycle, it is *most likely* that:
  A inflation indicators are stable.
  B aggregate economic activity is decreasing.
  C investor preference for government securities declines.

3 An economic peak is *most* closely associated with:
  A accelerating inflation.
  B stable unemployment.
  C declining capital spending.

4 Based on typical labor utilization patterns across the business cycle, productivity (output per hours worked) is *most likely* to be highest:
  A at the peak of a boom.
  B into a maturing expansion
  C at the bottom of a recession.

5 As the expansion phase of the business cycle advances from early stage to late stage, businesses *most likely* experience a decrease in:
  A labor costs.
  B capital investment.
  C availability of qualified workers.

6 An analyst writes in an economic report that the current phase of the business cycle is characterized by accelerating inflationary pressures and borrowing by companies. The analyst is *most likely* referring to the:
  A peak of the business cycle.
  B contraction phase of the business cycle.
  C early expansion phase of the business cycle.

7 In a recession, companies are *most likely* to adjust their stock of physical capital by:
  A selling it at fire sale prices.
  B not maintaining equipment.
  C quickly canceling orders for new construction equipment.

8 The inventory/sales ratio is *most likely* to be rising:
  A as a contraction unfolds.
  B partially into a recovery.
  C near the top of an economic cycle.

9 The Austrian economic school attributes the primary cause of the business cycle to:
  A misguided government intervention.

B the creative destruction of technological progress.

C sticky price and wage expectations that exaggerate trends.

10 A decrease in a country's total imports is *most likely* caused by:

A an increase in the pace of domestic GDP growth.

B a cyclical downturn in the economies of primary trading partners.

C persistent currency depreciation relative to primary trading partners.

11 Monetarists favor a limited role for the government because they argue:

A government policy responses may lag.

B firms take time to adjust to systemic shocks to the economy.

C resource use is efficient with marginal revenue and cost equal.

12 The discouraged worker category is defined to include people who:

A are overqualified for their job.

B could look for a job but choose not to.

C currently look for work without finding it.

13 According to the Austrian school, the *most appropriate* government response to an economic recession is to:

A allow the market to adjust naturally.

B maintain steady growth in the money supply.

C decrease the market rate of interest below its natural value.

14 A national government responds to a severe recession by funding numerous infrastructure projects using deficit spending. Which school of economic thought is *most* consistent with such action.

A Keynesian

B Monetarist

C Neoclassical

15 According to Real Business Cycle models, an economic contraction is *most likely* caused by:

A sticky wages.

B rising energy prices.

C a contraction in the money supply.

16 The unemployment rate is considered a lagging indicator because:

A new job types must be defined to count their workers.

B multi-worker households change jobs at a slower pace.

C businesses are slow to hire and fire due to related costs.

17 The category of persons who would be *most likely* to be harmed by an increase in the rate of inflation is:

A homeowners with fixed 30-year mortgages.

B retirees relying on a fixed annuity payment.

C workers employed under contracts with escalator clauses.

18 A decrease in both the labor force participation ratio and the unemployment rate is *most likely* caused by:

A an increase in discouraged workers.

B an increase in underemployed workers.

C a decrease in voluntarily unemployed persons.

19 The term that describes when inflation declines but nonetheless remains at a positive level is:
   A deflation.
   B stagflation.
   C disinflation.

20 During an economic recovery, a lagging unemployment rate is *most likely* attributable to:
   A businesses quickly rehiring workers.
   B new job seekers entering the labor force.
   C underemployed workers transitioning to higher-paying jobs.

21 The treasury manager of a large company has recently left his position to accept a promotion with a competitor six months from now. A statistical employment survey conducted now should categorize the status of the former treasury manager as:
   A underemployed.
   B voluntarily unemployed.
   C frictionally unemployed.

22 Deflation is *most likely* to be associated with:
   A a shortage of government revenue.
   B substantial macroeconomic contraction.
   C explicit monetary policy to combat inflation.

23 The *least likely* consequence of a period of hyperinflation is the:
   A reduced velocity of money.
   B increased supply of money.
   C possibility of social unrest.

The following information relates to Questions 24–25

Exhibit 1 Consumption Baskets and Prices Over Two Months

Date	November 2010		December 2010	
Goods	**Quantity**	**Price**	**Quantity**	**Price**
Sugar	70 kg	€ 0.90 / kg	120 kg	€ 1.00 / kg
Cotton	60 kg	€ 0.60 / kg	50 kg	€ 0.80 / kg

24 Assuming the base period for 2010 consumption is November and the initial price index is set at 100, then the inflation rate after calculating the December price index as a Laspeyres index is *closest* to:
   A 19.2%.
   B 36.4%.
   C 61.6%.

25 For the December consumption basket in Exhibit 1, the value of the Paasche index is *closest* to:

A 116.

B 148.

C 160.

---

26 A central bank will *most likely* allow the economy to self-correct in periods of:

A high inflation, fast economic growth, and low unemployment.

B low inflation, slow economic growth, and high unemployment.

C high inflation, slow economic growth, and high unemployment.

27 Disinflation is *best* described as a:

A decline in price levels.

B negative inflation rate.

C decline in the inflation rate.

28 The characteristic of national consumer price indexes which is *most* typically shared across major economies worldwide is:

A the geographic areas covered in their surveys.

B the weights they place on covered goods and services.

C their use in the determination of macroeconomic policy.

29 Of the following statements regarding the Producer Price Index (PPI), which is the *least likely*? The PPI:

A can influence the future CPI.

B category weights can vary more widely than analogous CPI terms.

C is used more frequently than CPI as a benchmark for adjusting labor contract payments.

30 The following presents selected commodity price data for July–August 2015:

	July 2015		August 2015	
Goods	**Quantity**	**Price**	**Quantity**	**Price**
Milk	18	€1.00/L	17	€1.00/L
Orange juice	6	€2.00/L	4	€2.50/L

Given the consumption basket and prices presented, which type of price index will result in the highest calculated inflation rate over a two-month time period?

A One that uses a current consumption basket

B One that uses a constant consumption basket

C One reflecting substitutions made by consumers over time

31 The inflation rate *most likely* relied on to determine public economic policy is:

A core inflation.

B headline inflation.

C index of food and energy prices.

32 What is the *most* important effect of labor productivity in a cost-push inflation scenario?

A Rising productivity indicates a strong economy and a bias towards inflation.

B The productivity level determines the economy's status relative to its "natural rate of unemployment."

C As productivity growth proportionately exceeds wage increases, product price increases are less likely.

33 Which of the following statements is the *best* description of the characteristics of economic indicators?

A Leading indicators are important because they track the entire economy.

B Lagging indicators in measuring past conditions do not require revisions.

C A combination of leading and coincident indicators can offer effective forecasts.

34 A product is part of a price index based on a fixed consumption basket. If, over time, the product's quality improves while its price stays constant, the measured inflation rate is *most likely*:

A unaffected.

B biased upward.

C biased downward.

35 A price index of goods and services that excludes food and energy is *most likely* used to calculate:

A core inflation.

B the GDP deflator.

C headline inflation.

36 When the spread between 10-year US Treasury yields and the federal funds rate narrows and at the same time the prime rate stays unchanged, this mix of indicators *most likely* forecasts future economic:

A growth.

B decline.

C stability.

37 Which of the following economic developments is *most likely* to cause cost-push inflation?

A Industrial capacity utilization rises to a very high level.

B Labor productivity increases faster than hourly labor costs.

C A shortage of trained workers emerges throughout the economy.

38 An economist expects the following:

- The decline in the unemployment rate will result in higher revenues for home retailers.
- A tighter labor market will put upward pressure on wages, compelling home retailers to raise prices.

Which type of inflation *best* corresponds to the economist's expectations?

A Stagflation

B Cost-push inflation

C Demand-pull inflation

39 If relative to prior values of their respective indicators, the inventory–sales ratio has risen, unit labor cost is stable, and real personal income has decreased, it is *most likely* that a peak in the business cycle:

A has occurred.

B is just about to occur.

C will occur sometime into the future.

40 Current economic statistics indicating little change in services inflation, rising residential building permits, and increasing average duration of unemployment are *best* interpreted as:

A conflicting evidence about the direction of economy.

B evidence that a cyclical upturn is expected to occur in the future.

C evidence that a cyclical downturn is expected to occur in the future.

41 When aggregate real personal income, industrial output, and the S&P 500 Index all increase in a given period, it is *most accurate* to conclude that a cyclical upturn is:

A occurring.

B about to end.

C about to begin.

42 Which of the following is *most likely* to increase after an increase in aggregate real personal income?

A Equity prices

B Building permits for new private housing units

C The ratio of consumer installment debt to income

43 Which of the following indicators is *most* appropriate in predicting a turning point in the economy?

A The Industrial Production Index

B The average bank prime lending rate

C Average weekly hours, manufacturing

SOLUTIONS

1 B is correct. The stages of the business cycle occur repeatedly over time.

2 B is correct. The net trend during contraction is negative.

3 A is correct. Inflation is rising at peaks.

4 C is correct. At the end of a recession, firms will run "lean production" to generate maximum output with the fewest number of workers.

5 C is correct. When an economy's expansion is well established, businesses often have difficulty finding qualified workers.

6 A is correct. Accelerating inflation and rapidly expanding capital expenditures typically characterize the peak of the business cycle. During such times, many businesses finance their capital expenditures with debt to expand their production capacity.

7 B is correct. Physical capital adjustments to downturns come through aging of equipment plus lack of maintenance.

8 C is correct. Near the top of a cycle, sales begin to slow before production is cut, leading to an increase in inventories relative to sales.

9 A is correct. Austrian economists see monetary policy mistakes as leading to booms and busts.

10 C is correct. When a nation's currency depreciates, domestic goods seem cheaper than foreign goods, placing downward pressure on demand for imports. When the depreciation persists for some time, the country's total imports are likely to decrease.

11 A is correct. Monetarists caution policy effects can occur long after the need for which they were implemented is no longer an issue.

12 B is correct. Discouraged workers are defined as persons who have stopped looking for work and are outside the labor force.

13 A is correct. Austrian economists advocate limited government intervention in the economy. They advise that the best thing to do in a recession is to allow the necessary market adjustment to take place.

14 A is correct. Keynesian economics is based on government intervention in the form of fiscal policy. The national government responds to the recession by using deficit spending to fund infrastructure projects.

15 B is correct. Real Business Cycle models conclude that expansions and contractions of the economy are responses to external shocks, such as supply shocks arising from advances in technology or changes in the relative prices of inputs (e.g., energy prices). An increase in energy prices shifts short-run aggregate supply to the left, resulting in higher prices and lower GDP.

16 C is correct. This effect makes unemployment rise more slowly as recessions start and fall more slowly as recoveries begin.

17 B is correct. With inflation, a fixed amount of money buys fewer goods and services, thus reducing purchasing power.

18 A is correct. Discouraged workers have given up seeking employment and are statistically outside the labor force. Therefore, an increase in discouraged workers will decrease the labor force and thus the labor participation ratio, which is the ratio of labor force to total working age population. Additionally, an increase in discouraged workers will decrease the unemployment rate because discouraged workers are not counted in the official unemployment rate.

19 C is correct. Disinflation is known as a reduction of inflation from a higher to lower, but still above zero, level.

20 B is correct. In an economic recovery, new job seekers return to the labor force, and because they seldom find work immediately, their return may initially raise the unemployment rate.

21 C is correct. Frictionally unemployed people are not working at the time of the employment survey but have recently left one job and are about to start another job. The frictionally unemployed have a job waiting for them and are not 100% unemployed, it is just that they have not started the new job yet. Although the treasury manager has left his current employment, he has accepted a new position at another firm starting in six months.

22 B is correct. Deflation is connected to a vicious cycle of reduced spending and higher unemployment.

23 A is correct. In hyperinflation, consumers accelerate their spending to beat prices increases and money circulates more rapidly.

24 A is correct. The Laspeyres index is calculated with these inputs:

- November consumption bundle: 70 × 0.9 + 60 × 0.6 = 99
- December consumption bundle: 70 × 1 + 60 × 0.8 = 118
- December price index: (118/99) × 100 = 119.19
- Inflation rate: (119.19/100) – 1 = 0.1919 = 19.19%

25 A is correct. The Paasche index uses the current product mix of consumption combined with the variation of prices. So for December, its value is

$$(120 \times 1 + 50 \times 0.8)/(120 \times 0.9 + 50 \times 0.6) = (160/138) \times 100 = 115.9$$

26 C is correct. This scenario is often referred to as stagflation. Here, the economy is likely to be left to self-correct because no short-term economic policy is thought to be effective.

27 C is correct. Disinflation is a decline in the inflation rate—for example, from 7% to 4%.

28 C is correct. Central banks typically use consumer price indexes to monitor inflation and evaluate their monetary policies.

29 C is correct. The CPI is typically used for this purpose, while the PPI is more closely connected to business contracts.

30 B is correct. The inflation rate calculated by using a constant consumption basket (the Laspeyres index) is 10%, derived as follows:

$$\begin{aligned} \text{July 2015 consumption basket} &= (18 \times €1) + (6 \times €2) = €30 \\ \text{August 2015 consumption basket} &= (18 \times €1) + (6 \times €2.5) = €33 \\ \text{Value of the Laspeyres index } (I_L) &= (€33/€30) \times 100 = €110 \\ \text{Inflation rate} &= (110/100) - 1 = 0.10 = 10\% \end{aligned}$$

The inflation rate calculated using a current consumption basket (the Paasche index) is 8%, derived as follows:

$$\begin{aligned} \text{July 2015 consumption basket} &= (17 \times €1) + (4 \times €2) = €25 \\ \text{August 2015 consumption basket} &= (17 \times €1) + (4 \times €2.5) = €27 \\ \text{Value of the Paasche index } (I_P) &= (€27/€25) \times 100 = €108 \\ \text{Inflation rate} &= (108/100) - 1 = 0.08 = 8\% \end{aligned}$$

The inflation rate calculated by "chaining" the monthly prices of consumption baskets as they change over time (the Fisher index) is derived as follows:

$$\text{Value of the Fisher index} = \sqrt{I_P \times I_L}$$

$$\text{Value of the Fisher Index} = \sqrt{€110 \times €108} = €108.99$$

$$\text{Inflation rate} = (108.99/100) - 1 = 0.0899 = 8.99\%$$

31 A is correct. Core inflation is less volatile since it excludes food and energy prices and therefore will not be as likely to lead to policy overreactions when serving as a target.

32 C is correct. For productivity, or output per hour, the faster that it can grow, the further that wages can rise without putting pressure on business costs per unit of output.

33 C is correct. While no single indicator is definitive, a mix of them—which can be affected by various economic determinants—can offer the strongest signal of performance.

34 B is correct. As the quality of a product improves, it satisfies people's needs and wants better. The measured inflation rate is skewed higher than otherwise unless an adjustment is made for the increase in the quality of the good. Even if the good's price had increased over time, the improvements in quality would still bias the measured inflation rate upward.

35 A is correct. A price index of goods and services that excludes food and energy is used to calculate core inflation. Policymakers often use core inflation when reading the trend in the economy and making economic policies. The reason is because policymakers are trying to avoid overreaction to short-term fluctuations in prices as a result of short-term changes in supply and demand.

36 B is correct. The narrowing spread of this leading indicator foretells a drop in short-term rates and a fall in economic activity. The prime rate is a lagging indicator and typically moves after the economy turns.

37 C is correct. Cost-push inflation occurs when rising costs compel businesses to raise prices generally. A shortage of trained workers leads to wage pressures, and even if such shortages impact only certain sectors of the economy, the economy overall may experience inflationary pressure.

38 B is correct. Cost-push inflation refers to the situation in which rising costs, usually wages, compel businesses to raise prices.

39 A is correct. Both inventory–sales and unit labor costs are lagging indicators that decline somewhat after a peak. Real personal income is a coincident indicator that by its decline shows a slowdown in business activity.

40 B is correct. Rising building permits—a leading indicator—indicates that an upturn is expected to occur or continue. Increasing average duration of unemployment—a lagging indicator—indicates that a downturn has occurred, whereas the lack of any change in services inflation—also a lagging indicator—is neither negative nor positive for the direction of the economy. Taken together, these statistics indicate that a cyclical upturn may be expected to occur.

41 A is correct. Aggregate real personal income and industrial output are coincident indicators, whereas the S&P 500 is a leading indicator. An increase in aggregate personal income and industrial output signals that an expansion is occurring, whereas an increase in the S&P 500 signals that an expansion will occur or is expected to continue. Taken together, these statistics indicate that a cyclical upturn is occurring.

42 C is correct. Aggregate real personal income is a coincident indicator of the business cycle and the ratio of consumer installment debt to income is a lagging indicator. Increases in the ratio of consumer installment debt follows increases in average aggregate income during the typical business cycle.

43 C is correct. Leading economic indicators have turning points that usually precede those of the overall economy. Average weekly hours, manufacturing is a leading economic indicator. The Industrial Production Index is a coincident economic indicator, and the average bank prime lending rate is a lagging economic indicator.

PRACTICE PROBLEMS

1 As the reserve requirement increases, the money multiplier:

A increases.

B decreases.

C remains the same.

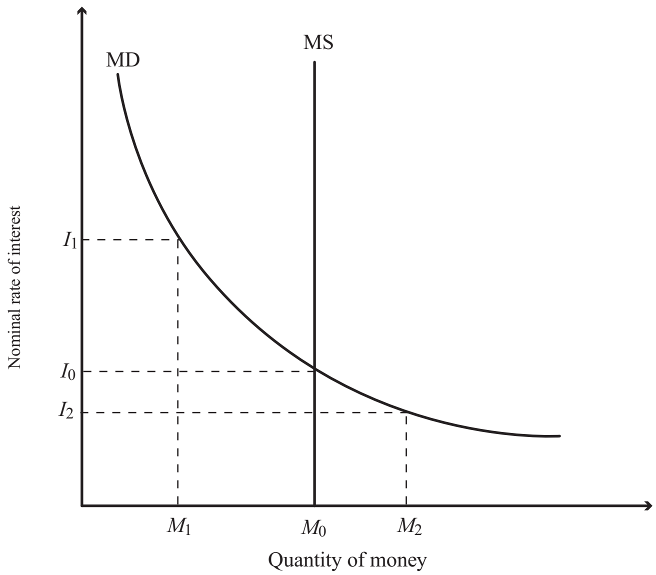
2 Which is the *most* accurate statement regarding the demand for money?

A Precautionary money demand is directly related to GDP.

B Transactions money demand is inversely related to returns on bonds.

C Speculative demand is inversely related to the perceived risk of other assets.

3 The following exhibit shows the supply and demand for money:



There is an excess supply of money when the nominal rate of interest is:

A I_0.

B I_1.

C I_2.

4 According to the theory of money neutrality, money supply growth does *not* affect variables such as real output and employment in:

A the long run.

B the short run.

C the long and short run.

5 Which of the following *best* describes a fundamental assumption when monetary policy is used to influence the economy?

A Financial markets are efficient.

B Money is not neutral in the short run.

C Official rates do not affect exchange rates.

6 Monetarists are *most likely* to believe:

A there is a causal relationship running from inflation to money.

B inflation can be affected by changing the money supply growth rate.

C rapid financial innovation in the market increases the effectiveness of monetary policy.

7 The proposition that the real interest rate is relatively stable is *most* closely associated with:

A the Fisher effect.

B money neutrality.

C the quantity theory of money.

8 Which of the following equations is a consequence of the Fisher effect?

A Nominal interest rate = Real interest rate + Expected rate of inflation.

B Real interest rate = Nominal interest rate + Expected rate of inflation.

C Nominal interest rate = Real interest rate + Market risk premium.

9 Central banks would typically be *most* concerned with costs of:

A low levels of inflation that are anticipated.

B moderate levels of inflation that are anticipated.

C moderate levels of inflation that are not anticipated.

10 Monetary policy is *least likely* to include:

A setting an inflation rate target.

B changing an official interest rate.

C enacting a transfer payment program.

11 Which role is a central bank *least likely* to assume?

A Lender of last resort.

B Sole supervisor of banks.

C Supplier of the currency.

12 Which is the *most* accurate statement regarding central banks and monetary policy?

A Central bank activities are typically intended to maintain price stability.

B Monetary policies work through the economy via four independent channels.

C Commercial and interbank interest rates move inversely to official interest rates.

13 When a central bank announces a decrease in its official policy rate, the desired impact is an increase in:

A investment.

B interbank borrowing rates.

C the national currency's value in exchange for other currencies.

14 Which action is a central bank *least likely* to take if it wants to encourage businesses and households to borrow for investment and consumption purposes?

A Sell long-dated government securities.

B Purchase long-dated government treasuries.

C Purchase mortgage bonds or other securities.

15 A central bank that decides the desired levels of interest rates and inflation and the horizon over which the inflation objective is to be achieved is *most* accurately described as being:

A target independent and operationally independent.

B target independent but not operationally independent.

C operationally independent but not target independent.

16 A country that maintains a target exchange rate is *most likely* to have which outcome when its inflation rate rises above the level of the inflation rate in the target country?

A An increase in short-term interest rates.

B An increase in the domestic money supply.

C An increase in its foreign currency reserves.

17 A central bank's repeated open market purchases of government bonds:

A decreases the money supply.

B is prohibited in most countries.

C is consistent with an expansionary monetary policy.

18 In theory, setting the policy rate equal to the neutral interest rate should promote:

A stable inflation.

B balanced budgets.

C greater employment.

19 A prolonged period of an official interest rate very close to zero without an increase in economic growth *most likely* suggests:

A quantitative easing must be limited to be successful.

B there may be limits to the effectiveness of monetary policy.

C targeting reserve levels is more important than targeting interest rates.

20 Raising the reserve requirement is *most likely* an example of which type of monetary policy?

A Neutral.

B Expansionary.

C Contractionary.

21 Which of the following is a limitation on the ability of central banks to stimulate growth in periods of deflation?

A Ricardian equivalence.

B The interaction of monetary and fiscal policy.

C The fact that interest rates cannot fall significantly below zero.

22 The *least likely* limitation to the effectiveness of monetary policy is that central banks cannot:

A accurately determine the neutral rate of interest.

B regulate the willingness of financial institutions to lend.

C control amounts that economic agents deposit into banks.

23 Which of the following is the *most likely* example of a tool of fiscal policy?

A Public financing of a power plant.

B Regulation of the payment system.

C Central bank's purchase of government bonds.

24 The *least likely* goal of a government's fiscal policy is to:

A redistribute income and wealth.

B influence aggregate national output.

C ensure the stability of the purchasing power of its currency.

25 Given an independent central bank, monetary policy actions are *more likely* than fiscal policy actions to be:

A implementable quickly.

B effective when a specific group is targeted.

C effective when combating a deflationary economy.

26 Which statement regarding fiscal policy is *most* accurate?

A To raise business capital spending, personal income taxes should be reduced.

B Cyclically adjusted budget deficits are appropriate indicators of fiscal policy.

C An increase in the budget surplus is associated with expansionary fiscal policy.

27 The *least likely* explanation for why fiscal policy cannot stabilize aggregate demand completely is that:

A private sector behavior changes over time.

B policy changes are implemented very quickly.

C fiscal policy focuses more on inflation than on unemployment.

28 Which of the following *best* represents a contractionary fiscal policy?

A Public spending on a high-speed railway.

B A temporary suspension of payroll taxes.

C A freeze in discretionary government spending.

29 A "pay-as-you-go" rule, which requires that any tax cut or increase in entitlement spending be offset by an increase in other taxes or reduction in other entitlement spending, is an example of which fiscal policy stance?

A Neutral.

B Expansionary.

C Contractionary.

30 Quantitative easing, the purchase of government or private securities by the central banks from individuals and/or institutions, is an example of which monetary policy stance?

A Neutral.

B Expansionary.

C Contractionary.

31 The *most likely* argument against high national debt levels is that:

A the debt is owed internally to fellow citizens.

B they create disincentives for economic activity.

C they may finance investment in physical and human capital.

32 Which statement regarding fiscal deficits is *most* accurate?

A Higher government spending may lead to higher interest rates and lower private sector investing.

B Central bank actions that grow the money supply to address deflationary conditions decrease fiscal deficits.

C According to the Ricardian equivalence, deficits have a multiplicative effect on consumer spending.

33 Which policy alternative is *most likely* to be effective for growing both the public and private sectors?

A Easy fiscal/easy monetary policy.

B Easy fiscal/tight monetary policy.

C Tight fiscal/tight monetary policy.

SOLUTIONS

1 B is correct. There is an inverse relationship between the money multiplier and the reserve requirement. The money multiplier is equal to 1 divided by the reserve requirement.

2 A is correct. Precautionary money demand is directly related to GDP. Precautionary money balances are held to provide a buffer against unforeseen events that might require money. Precautionary balances tend to rise with the volume and value of transactions in the economy, and therefore rise with GDP.

3 B is correct. When the interest rate on bonds is I_1 there is an excess supply of money (equal to $M_0 - M_1 > 0$). Economic agents would seek to buy bonds with their excess money balances, which would force the price of bonds up and the interest rate down to I_0.

4 A is correct. According to the theory of money neutrality, an increase in the money supply ultimately leads to an increase in the price level and leaves real variables unaffected in the long run.

5 B is correct. If money were neutral in the short run, monetary policy would not be effective in influencing the economy.

6 B is correct. By definition, monetarists believe prices may be controlled by manipulating the money supply.

7 A is correct. The Fisher effect is based on the idea that the real interest rate is relatively stable. Changes in the nominal interest rate result from changes in expected inflation.

8 A is correct. The Fisher effect implies that changes in the nominal interest rate reflect changes in expected inflation, which is consistent with Nominal interest rate = Real interest rate + Expected rate of inflation.

9 C is correct. Low levels of inflation has higher economic costs than moderate levels, all else equal; unanticipated inflation has greater costs than anticipated inflation.

10 C is correct. Transfer payment programs represent fiscal, not monetary policy.

11 B is correct. The supervision of banks is not a role that all central banks assume. When it is a central bank's role, responsibility may be shared with one or more entities.

12 A is correct. Central bank activities are typically intended to maintain price stability. Concerning choice B, note that the transmission channels of monetary policy are not independent.

13 A is correct. Investment is expected to move inversely with the official policy rate.

14 A is correct. Such action would tend to constrict the money supply and increase interest rates, all else equal.

15 A is correct. The central bank described is target independent because it set its own targets (e.g., the target inflation rate) and operationally independent because it decides how to achieve its targets (e.g., the time horizon).

16 A is correct. Interest rates are expected to rise to protect the exchange rate target.

17 C is correct. The purchase of government bonds via open market operations increases banking reserves and the money supply; it is consistent with an expansionary monetary policy.

18 A is correct. The neutral rate of interest is that rate of interest that neither stimulates nor slows down the underlying economy. The neutral rate should be consistent with stable long-run inflation.

19 B is correct. A central bank would decrease an official interest rate to stimulate the economy. The setting in which an official interest rate is lowered to zero (or even slightly below zero) without stimulating economic growth suggests that there are limits to monetary policy.

20 C is correct. Raising reserve requirements should slow money supply growth.

21 C is correct. Deflation poses a challenge to conventional monetary policy because once the central bank has cut nominal interest rates to zero (or slightly less than zero) to stimulate the economy, they cannot cut them further.

22 A is correct. The inability to determine exactly the neutral rate of interest does not necessarily limit the power of monetary policy.

23 A is correct. Public financing of a power plant could be described as a fiscal policy tool to stimulate investment.

24 C is correct. Ensuring stable purchasing power is a goal of monetary rather than fiscal policy. Fiscal policy involves the use of government spending and tax revenue to affect the overall level of aggregate demand in an economy and hence the level of economic activity.

25 A is correct. Monetary actions may face fewer delays to taking action than fiscal policy, especially when the central bank is independent.

26 B is correct. Cyclically adjusted budget deficits are appropriate indicators of fiscal policy. These are defined as the deficit that would exist if the economy was at full employment (or full potential output).

27 B is correct. Fiscal policy is subject to recognition, action, and impact lags.

28 C is correct. A freeze in discretionary government spending is an example of a contractionary fiscal policy.

29 A is correct. A "pay-as-you-go" rule is a neutral policy because any increases in spending or reductions in revenues would be offset. Accordingly, there would be no net impact on the budget deficit/surplus.

30 B is correct. Quantitative easing is an example of an expansionary monetary policy stance. It attempts to spur aggregate demand by drastically increasing the money supply.

31 B is correct. The belief is that high levels of debt to GDP may lead to higher future tax rates which may lead to disincentives to economic activity.

32 A is correct. Government borrowing may compete with private sector borrowing for investment purposes.

33 A is correct. If both fiscal and monetary policies are "easy," then the joint impact will be highly expansionary, leading to a rise in aggregate demand, low interest rates, and growing private and public sectors.

PRACTICE PROBLEMS

1 Which of the following statements *best* describes the benefits of international trade?

A Countries gain from exchange and specialization.

B Countries receive lower prices for their exports and pay higher prices for imports.

C Absolute advantage is required for a country to benefit from trade in the long term.

2 Which of the following statements *best* describes the costs of international trade?

A Countries without an absolute advantage in producing a good cannot benefit significantly from international trade.

B Resources may need to be allocated into or out of an industry and less-efficient companies may be forced to exit an industry, which in turn may lead to higher unemployment.

C Loss of manufacturing jobs in developed countries as a result of import competition means that developed countries benefit far less than developing countries from trade.

3 Suppose the cost of producing tea relative to copper is lower in Tealand than in Copperland. With trade, the copper industry in Copperland would *most likely*:

A expand.

B contract.

C remain stable.

4 A country has a comparative advantage in producing a good if:

A it is able to produce the good at a lower cost than its trading partner.

B its opportunity cost of producing the good is less than that of its trading partner.

C its opportunity cost of producing the good is more than that of its trading partner.

5 Suppose Mexico exports vegetables to Brazil and imports flashlights used for mining from Brazil. The output per worker per day in each country is as follows:

	Flashlights	Vegetables
Mexico	20	60
Brazil	40	80

Which country has a comparative advantage in the production of vegetables and what is the *most* relevant opportunity cost?

A Brazil: 2 vegetables per flashlight.

B Mexico: 1.5 vegetables per flashlight.

C Mexico: ⅓ flashlight per vegetable.

6 Suppose three countries produce bananas and pencils with output per worker per day in each country as follows:

	Bananas	Pencils
Mexico	20	40
Brazil	30	90
Canada	40	160

Which country has the greatest comparative advantage in the production of bananas?

A Canada.

B Brazil.

C Mexico.

7 In the Ricardian trade model, a country captures more of the gains from trade if:

A it produces all products while its trade partner specializes in one good.

B the terms of trade are closer to its autarkic prices than to its partner's autarkic prices.

C the terms of trade are closer to its partner's autarkic prices than to its autarkic prices.

8 Germany has much more capital per worker than Portugal. In autarky each country produces and consumes both machine tools and wine. Production of machine tools is relatively capital intensive whereas winemaking is labor intensive. According to the Heckscher–Ohlin model, when trade opens:

A Germany should export machine tools and Portugal should export wine.

B Germany should export wine and Portugal should export machine tools.

C Germany should produce only machine tools and Portugal should produce only wine.

9 According to the Heckscher–Ohlin model, when trade opens:

A the scarce factor gains relative to the abundant factor in each country.

B the abundant factor gains relative to the scarce factor in each country.

C income is redistributed between countries but not within each country.

10 Which type of trade restriction would *most likely* increase domestic government revenue?

A Tariff.

B Import quota.

C Export subsidy.

11 Which of the following trade restrictions is likely to result in the greatest welfare loss for the importing country?

A A tariff.

B An import quota.

C A voluntary export restraint.

12 A large country can:

A benefit by imposing a tariff.

B benefit with an export subsidy.

C not benefit from any trade restriction.

13 If Brazil and South Africa have free trade with each other, a common trade policy against all other countries, but no free movement of factors of production between them, then Brazil and South Africa are part of a:

A customs union.

B common market.

C free trade area (FTA).

14 Which of the following factors *best* explains why regional trading agreements are more popular than larger multilateral trade agreements?

A Minimal displacement costs.

B Trade diversions benefit members.

C Quicker and easier policy coordination.

15 The sale of mineral rights would be captured in which of the following balance of payments components?

A Capital account.

B Current account.

C Financial account.

16 Patent fees and legal services are recorded in which of the following balance of payments components?

A Capital account.

B Current account.

C Financial account.

17 During the most recent quarter, a steel company in South Korea had the following transactions

- Bought iron ore from Australia for AUD50 million.
- Sold finished steel to the United States for USD65 million.
- Borrowed AUD50 million from a bank in Sydney, Australia.
- Received a USD10 million dividend from US subsidiary.
- Paid KRW550 million to a Korean shipping company.

Which of the following would be reflected in South Korea's current account balance for the quarter?

A The loan.

B The shipping.

C The dividend.

18 Which of the following *most likely* contributes to a current account deficit?

A High taxes.

B Low private savings.

C Low private investment.

19 Which of the following chronic deficit conditions is *least* alarming to the deficit country's creditors?

A High consumption.

B High private investment.

C High government spending.

20 Which of the following international trade organizations regulates cross-border exchange among nations on a global scale?

A World Bank Group (World Bank).

B World Trade Organization (WTO).

C International Monetary Fund (IMF).

21 Which of the following international trade organizations has a mission to help developing countries fight poverty and enhance environmentally sound economic growth?

A World Bank Group (World Bank).

B World Trade Organization (WTO).

C International Monetary Fund (IMF).

22 Which of the following organizations helps to keep global systemic risk under control by preventing contagion in scenarios such as the 2010 Greek sovereign debt crisis?

A World Bank Group (World Bank).

B World Trade Organization (WTO).

C International Monetary Fund (IMF).

23 Which of the following international trade bodies was the only multilateral body governing international trade from 1948 to 1995?

A World Trade Organization (WTO).

B International Trade Organization (ITO).

C General Agreement on Tariffs and Trade (GATT).

SOLUTIONS

1 A is correct. Countries gain from exchange when trade enables each country to receive a higher price for exported goods and/or pay a lower price for imported goods. This leads to more efficient resource allocation and allows consumption of a larger variety of goods.

2 B is correct. Resources may need to be reallocated into or out of an industry, depending on whether that industry is an exporting sector or an import-competing sector of that economy. As a result of this adjustment process, less-efficient companies may be forced to exit the industry, which in turn may lead to higher unemployment and the need for retraining in order for displaced workers to find jobs in expanding industries.

3 A is correct. The copper industry in Copperland would benefit from trade. Because the cost of producing copper relative to producing tea is lower in Copperland than in Tealand, Copperland will export copper and the industry will expand.

4 B is correct. Comparative advantage is present when the opportunity cost of producing a good is less than that of a trading partner.

5 C is correct. While Brazil has an absolute advantage in the production of both flashlights and vegetables, Mexico has a comparative advantage in the production of vegetables. The opportunity cost of vegetables in Mexico is ⅓ per flashlight, while the opportunity cost of vegetables in Brazil is ½ per flashlight.

6 C is correct. Mexico has the lowest opportunity cost to produce an extra banana. The opportunity cost is 2 pencils per banana in Mexico, 3 pencils per banana in Brazil, and 4 pencils per banana in Canada.

7 C is correct. A country gains if trade increases the price of its exports relative to its imports as compared to its autarkic prices, i.e. the final terms of trade are more favorable than its autarkic prices. If the relative price of exports and imports remains the same after trade opens, then the country will consume the same basket of goods before and after trade opens, and it gains nothing from the ability to trade. In that case, its trade partner will capture all of the gains. Of course, the opposite is true if the roles are reversed. More generally, a country captures more of the gains from trade the more the final terms of trade differ from its autarkic prices.

8 A is correct. In the Heckscher–Ohlin model a country has a comparative advantage in goods whose production is intensive in the factor with which it is relatively abundantly endowed. In this case, capital is relatively abundant in Germany so Germany has a comparative advantage in producing the capital-intensive product: machine tools. Portugal is relatively labor abundant, hence should produce and export the labor-intensive product: wine.

9 B is correct. As a country opens up to trade, it has a favorable impact on the abundant factor, and a negative impact on the scarce factor. This is because trade causes the output mix to change and therefore changes the relative demand for the factors of production. Increased output of the export product increases demand for the factor that is used intensively in its production, while reduced output of the import product decreases demand for the factor used intensively in its production. Because the export (import) product uses the abundant (scarce) factor intensively, the abundant factor gains relative to the scarce factor in each country.

10 A is correct. The imposition of a tariff will most likely increase domestic government revenue. A tariff is a tax on imports collected by the importing country's government.

11 C is correct. With a voluntary export restraint, the price increase induced by restricting the quantity of imports (= quota rent for equivalent quota = tariff revenue for equivalent tariff) accrues to foreign exporters and/or the foreign government.

12 A is correct. By definition, a large country is big enough to affect the world price of its imports and exports. A large country can benefit by imposing a tariff if its terms of trade improve by enough to outweigh the welfare loss arising from inefficient allocation of resources.

13 A is correct. A customs union extends a free trade area (FTA) by not only allowing free movement of goods and services among members, but also creating common trade policy against non-members. Unlike a more integrated common market, a customs union does not allow free movement of factors of production among members.

14 C is correct. Regional trading agreements are politically less contentious and quicker to establish than multilateral trade negotiations (for example, under the World Trade Organization). Policy coordination and harmonization is easier among a smaller group of countries.

15 A is correct. The capital account measures capital transfers and sale and purchase of non-produced, non-financial assets such as mineral rights and intangible assets.

16 B is correct. The current account measures the flows of goods and services (including income from foreign investments). Patent fees and legal services are both captured in the services sub-account of the current account.

17 C is correct. The current account includes income received on foreign investments. The Korean company effectively "exported" the use of its capital during the quarter to its US subsidiary, and the dividend represents payment for those services.

18 B is correct. A current account deficit tends to result from low private saving, high private investment, a government deficit, or a combination of the three. Of the choices, only low private savings contributes toward a current account deficit.

19 B is correct. A current account deficit tends to result from low private saving, high private investment, low government savings, or a combination of the three. Of these choices, only high investments can increase productive resources and improve future ability to repay creditors.

20 B is correct. The WTO provides the legal and institutional foundation of the multinational trading system and is the only international organization that regulates cross-border trade relations among nations on a global scale. The WTO's mission is to foster free trade by providing a major institutional and regulatory framework of global trade rules. Without such global trading rules, today's global transnational corporations would be hard to conceive.

21 A is correct. The World Bank's mission is to help developing countries fight poverty and enhance environmentally sound economic growth. The World Bank helps to create the basic economic infrastructure essential for creation and maintenance of domestic financial markets and a well-functioning financial industry in developing countries.

22 C is correct. From an investment perspective, the IMF helps to keep country-specific market risk and global systemic risk under control. The Greek sovereign debt crisis on 2010, which threatened to destabilize the entire European banking system, is a recent example. The IMF's mission is to ensure the stability of the international monetary system, the system of exchange rates and international payments which enables countries to buy goods and services from each other.

23 C is correct. The GATT was the only multilateral body governing international trade from 1948 to 1995. It operated for almost half a century as a quasi-institutionalized, provisional system of multilateral treaties and included several rounds of negotiations.

PRACTICE PROBLEMS

1 An exchange rate:

A is most commonly quoted in real terms.

B is the price of one currency in terms of another.

C between two currencies ensures they are fully convertible.

2 A decrease in the real exchange rate (quoted in terms of domestic currency per unit of foreign currency) is *most likely* to be associated with an increase in which of the following?

A Foreign price level.

B Domestic price level.

C Nominal exchange rate.

3 In order to minimize the foreign exchange exposure on a euro-denominated receivable due from a German company in 100 days, a British company would *most likely* initiate a:

A spot transaction.

B forward contract.

C real exchange rate contract.

4 Which of the following counterparties is *most likely* to be considered a sell-side foreign-exchange market participant?

A A large corporation that borrows in foreign currencies.

B A sovereign wealth fund that influences cross-border capital flows.

C A multinational bank that trades foreign exchange with its diverse client base.

5 What will be the effect on a direct exchange rate quote if the domestic currency appreciates?

A Increase

B Decrease

C No change

6 An executive from Switzerland checked into a hotel room in Spain and was told by the hotel manager that 1 EUR will buy 1.2983 CHF. From the executive's perspective, an indirect exchange rate quote would be:

A 0.7702 EUR per CHF.

B 0.7702 CHF per EUR.

C 1.2983 EUR per CHF.

7 Over the past month, the Swiss Franc (CHF) has depreciated 12 percent against pound sterling (GBP). How much has the pound sterling appreciated against the Swiss Franc?

A 12%

B Less than 12%

C More than 12%

8 An exchange rate between two currencies has increased to 1.4500. If the base currency has appreciated by 8% against the price currency, the initial exchange rate between the two currencies was *closest* to:

A 1.3340.
B 1.3426.
C 1.5660.

The following information relates to Questions 9–10

A dealer provides the following quotes:

Ratio	Spot rate
CNY/HKD	0.8422
CNY/ZAR	0.9149
CNY/SEK	1.0218

9 The spot ZAR/HKD cross-rate is *closest* to:
A 0.9205.
B 1.0864.
C 1.2978.

10 Another dealer is quoting the ZAR/SEK cross-rate at 1.1210. The arbitrage profit that can be earned is *closest* to:
A ZAR 3671 per million SEK traded.
B SEK 4200 per million ZAR traded.
C ZAR 4200 per million SEK traded.

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11 A BRL/MXN spot rate is listed by a dealer at 0.1378. The 6-month forward rate is 0.14193. The 6-month forward points are *closest* to:
A –41.3.
B +41.3.
C +299.7.

12 A three-month forward exchange rate in CAD/USD is listed by a dealer at 1.0123. The dealer also quotes 3-month forward points as a percentage at 6.8%. The CAD/USD spot rate is *closest* to:
A 0.9478.
B 1.0550.
C 1.0862.

13 If the base currency in a forward exchange rate quote is trading at a forward discount, which of the following statements is *most* accurate?
A The forward points will be positive.
B The forward percentage will be negative.
C The base currency is expected to appreciate versus the price currency.

14 A forward premium indicates:
A an expected increase in demand for the base currency.
B the interest rate is higher in the base currency than in the price currency.
C the interest rate is higher in the price currency than in the base currency.

15 The JPY/AUD spot exchange rate is 82.42, the JPY interest rate is 0.15%, and the AUD interest rate is 4.95%. If the interest rates are quoted on the basis of a 360-day year, the 90-day forward points in JPY/AUD would be *closest* to:

- **A** –377.0.
- **B** –97.7.
- **C** 98.9.

16 Which of the following is *not* a condition of an ideal currency regime?

- **A** Fully convertible currencies.
- **B** Fully independent monetary policy.
- **C** Independently floating exchange rates.

17 In practice, both a fixed parity regime and a target zone regime allow the exchange rate to float within a band around the parity level. The *most likely* rationale for the band is that the band allows the monetary authority to:

- **A** be less active in the currency market.
- **B** earn a spread on its currency transactions.
- **C** exercise more discretion in monetary policy.

18 A fixed exchange rate regime in which the monetary authority is legally required to hold foreign exchange reserves backing 100% of its domestic currency issuance is best described as:

- **A** dollarization.
- **B** a currency board.
- **C** a monetary union.

19 A country with a trade deficit will *most likely*:

- **A** have an offsetting capital account surplus.
- **B** save enough to fund its investment spending.
- **C** buy assets from foreigners to fund the imbalance.

20 A large industrialized country has recently devalued its currency in an attempt to correct a persistent trade deficit. Which of the following domestic industries is *most likely* to benefit from the devaluation?

- **A** Luxury cars.
- **B** Branded prescription drugs.
- **C** Restaurants and live entertainment venues.

21 A country with a persistent trade surplus is being pressured to let its currency appreciate. Which of the following *best* describes the adjustment that must occur if currency appreciation is to be effective in reducing the trade surplus?

- **A** Domestic investment must decline relative to saving.
- **B** Foreigners must increase investment relative to saving.
- **C** Global capital flows must shift toward the domestic market.

SOLUTIONS

1 B is correct. The exchange rate is the number of units of the price currency that 1 unit of the base currency will buy. Equivalently, it is the number of units of the price currency required to buy 1 unit of the base currency.

2 B is correct. The real exchange rate (quoted in terms of domestic currency per unit of foreign currency) is given by:

$$\text{Real exchange rate}_{(d/f)} = S_{d/f} \times (P_f/P_d)$$

An increase in the domestic price level (P_d) *decreases* the real exchange rate because it implies an *increase* in the relative purchasing power of the domestic currency.

3 B is correct. The receivable is due in 100 days. To reduce the risk of currency exposure, the British company would initiate a forward contract to sell euros/buy pounds at an exchange rate agreed to today. The agreed-upon rate is called the forward exchange rate.

4 C is correct. The sell side generally consists of large banks that sell foreign exchange and related instruments to buy-side clients. These banks act as market makers, quoting exchange rates at which they will buy (the bid price) or sell (the offer price) the base currency.

5 B is correct. In the case of a direct exchange rate, the domestic currency is the price currency (the numerator) and the foreign currency is the base currency (the denominator). If the domestic currency appreciates, then fewer units of the domestic currency are required to buy 1 unit of the foreign currency and the exchange rate (domestic per foreign) declines. For example, if sterling (GBP) appreciates against the euro (EUR), then euro–sterling (GBP/EUR) might decline from 0.8650 to 0.8590.

6 A is correct. An indirect quote takes the foreign country as the price currency and the domestic country as the base currency. To get CHF—which is the executive's domestic currency—as the base currency, the quote must be stated as EUR/CHF. Using the hotel manager's information, the indirect exchange rate is (1/1.2983) = 0.7702.

7 C is correct. The appreciation of sterling against the Swiss franc is simply the inverse of the 12% depreciation of the Swiss franc against Sterling: [1/(1 – 0.12)] – 1 = (1/0.88) – 1 = 0.1364, or 13.64%.

8 B is correct. The percentage appreciation of the base currency can be calculated by dividing the appreciated exchange rate by the initial exchange rate. In this case, the unknown is the initial exchange rate. The initial exchange is the value of X that satisfies the formula:

$$1.4500/X = 1.08$$

Solving for X leads to 1.45/1.08 = 1.3426.

9 A is correct. To get to the ZAR/HKD cross-rate, it is necessary to take the inverse of the CNY/ZAR spot rate and then multiply by the CNY/HKD exchange rate:

$$\begin{aligned}\text{ZAR/HKD} &= (\text{CNY/ZAR})^{-1} \times (\text{CNY/HKD})\\ &= (1 / 0.9149) \times 0.8422 = 0.9205\end{aligned}$$

10 C is correct. The ZAR/SEK cross-rate from the original dealer is (1.0218/0.9149) = 1.1168, which is lower than the quote from the second dealer. To earn an arbitrage profit, a currency trader would buy SEK (sell ZAR) from the original dealer and sell SEK (buy ZAR) to the second dealer. On 1 million SEK the profit would be

SEK 1,000,000 × (1.1210 – 1.1168) = ZAR 4200

11 B is correct. The number of forward points equals the forward rate minus the spot rate, or 0.14193 – 0.1378 = 0.00413, multiplied by 10,000: 10,000 × 0.00413= 41.3 points. By convention, forward points are scaled so that ±1 forward point corresponds to a change of ±1 in the last decimal place of the spot exchange rate.

12 A is correct. Given the forward rate and forward points as a percentage, the unknown in the calculation is the spot rate. The calculation is as follows:

Spot rate × (1 + Forward points as a percentage) = Forward rate

Spot rate × (1 + 0.068) = 1.0123

Spot = 1.0123/1.068 =0.9478

13 B is correct. The base currency trading at a forward discount means that 1 unit of the base currency costs less for forward delivery than for spot delivery; i.e., the forward exchange rate is less than the spot exchange rate. The forward points, expressed either as an absolute number of points or as a percentage, are negative.

14 C is correct. To eliminate arbitrage opportunities, the spot exchange rate (S), the forward exchange rate (F), the interest rate in the base currency (i_b), and the interest rate in the price currency (i_p) must satisfy:

$$\frac{F}{S} = \left(\frac{1 + i_p}{1 + i_b}\right)$$

According to this formula, the base currency will trade at forward premium ($F > S$) if, and only if, the interest rate in the price currency is higher than the interest rate in the base currency ($i_p > i_b$).

15 B is correct. The forward exchange rate is given by

$$F_{JPY/AUD} = S_{JPY/AUD}\left(\frac{1 + i_{JPY}\tau}{1 + i_{AUD}\tau}\right) = 82.42\left(\frac{1 + .0015\left(\frac{90}{360}\right)}{1 + .0495\left(\frac{90}{360}\right)}\right)$$

$$= 82.42 \times .98815 = 81.443$$

The forward points are 100 × (F – S) = 100 × (81.443 – 82.42) = 100 × (–0.977) = –97.7. Note that because the spot exchange rate is quoted with two decimal places, the forward points are scaled by 100.

16 C is correct. An ideal currency regime would have credibly fixed exchange rates among all currencies. This would eliminate currency-related uncertainty with respect to the prices of goods and services as well as real and financial assets.

17 C is correct. Fixed exchange rates impose severe limitations on the exercise of independent monetary policy. With a rigidly fixed exchange rate, domestic interest rates, monetary aggregates (e.g., money supply), and credit conditions are dictated by the requirement to buy/sell the currency at the rigid parity. Even

a narrow band around the parity level allows the monetary authority to exercise some discretionary control over these conditions. In general, the wider the band, the more independent control the monetary authority can exercise.

18 B is correct. With a currency board, the monetary authority is legally required to exchange domestic currency for a specified foreign currency at a fixed exchange rate. It cannot issue domestic currency without receiving foreign currency in exchange, and it must hold that foreign currency as a 100% reserve against the domestic currency issued. Thus, the country's monetary base (bank reserves plus notes and coins in circulation) is fully backed by foreign exchange reserves.

19 A is correct. A trade deficit must be exactly matched by an offsetting capital account surplus to fund the deficit. A capital account surplus reflects borrowing from foreigners (an increase in domestic liabilities) and/or selling assets to foreigners (a decrease in domestic assets). A capital account surplus is often referred to as a "capital inflow" because the net effect is foreign investment in the domestic economy.

20 A is correct. A devaluation of the domestic currency means domestic producers are cutting the price faced by their foreign customers. The impact on their unit sales and their revenue depends on the elasticity of demand. Expensive luxury goods exhibit high price elasticity. Hence, luxury car producers are likely to experience a sharp increase in sales and revenue due to the devaluation.

21 C is correct. The trade surplus cannot decline unless the capital account deficit also declines. Regardless of the mix of assets bought and sold, foreigners must buy more assets from (or sell fewer assets to) domestic issuers/investors.